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HHD TEST BLAST

06 May 2004

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Test Blast Location

- Lower Access Road as Drilling Unit Prepares Test Blast Holes
- View is Facing East

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Test Blast Zone

- This View is South East
- Blast Mats are Placed At the Toe of the Rock Mass

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Pre Blast Drilling

- Drilling Unit Finishing Test Hole Drilling

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Pre Blast – Drilled Hole

- Please Note Orange Cone Inverted in Hole to Prevent Debris From Falling In
- Hole Is Approximately 2-1/2 inches Diameter

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Pre Blast – Loading Holes

- Blaster In Charge is Loading Cast Boosters in Individual Holes
- Cast Booster is Shock Tube Detonator
- Yellow Cord is Shock Tube (Non-Electric Detonating Cord)

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Pre Blast – Loading Holes

- Flagmatized Explosive Stick Being Loaded in Hole

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Pre Blast – Loading Holes

- Continued Loading of Individual Holes With Flagmatized Explosives

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Pre Blast – Pouring Stemming

- Stemming is Added Above Explosives to Reduce Overpressure Caused by the Blast

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Pre Blast – Set Holes

- Holes Are Loaded and Being Connected Together
- Green Cord is Timed Cord for Sequencing of Blast

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Pre Blast – Placing Protective Mats

- Final Placement of Additional Blast Mats

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Pre Blast – Placing Protective Mats

- Total of 9 each Blasting Mats Were Used to Prevent Flyrock

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Pre Blast – Protective Mats Placed

- Blast Area Completely Covered by Blasting Mats Prior to Blast

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Blast

- The Earth Moves

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Post Blast

- Approximately 200 CY of Material is Moved Down the Slope Into the Lower Access Road for Muck-Out
- No Flyrock Was Observed
- One Large Boulder Rolled Against a Support Leg of an Instrumentation Platform Slightly Bending the Leg.

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Post Blast

- Large Boulders Observed Resulting From Blast Holes Containing Lighter Explosives Loads at the Tops

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Post Blast – Monitoring Results

- Operations Facilities Survey Resulted in No Visible Damage to Any Structures
- All Systems Functioned Properly

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Instrumentation Readings

- Monitor on Ground 42-ft. West of Shot Recorded 3.34 PPV
- Monitor on Ground 126-ft West of Shot Recorded 0.415 PPV
- Monitor on Pier 1, 70-ft North of Blast Recorded 0.555 PPV
- Monitor Located South of Pier 1 on Ground 65-ft from Blast Recorded 1.07 PPV

- *PPV-The maximum of the three ground vibration velocities measured in the vertical, longitudinal and transverse directions. Velocity units are expressed in inches per second (ips).
- Specified maximum allowed PPV is 16.0 ips